CLAIMS

I claim:

1. A system for improving signal-to-noise ratio for an eye gaze tracker, comprising:

an illuminator for illuminating a user's eye with light radiation;

a camera for detecting an illuminator signal from said illuminator light radiation reflected from the user's eye and also detecting ambient light noise, said camera outputting an output signal;

means for synchronizing said illuminator to turn on with a first interval of said camera and turn off with a second interval of said camera;

means for digitizing said output signal and capturing a first image from said first interval having an illuminator signal portion and an ambient light noise portion and capturing a second image from said second interval having said ambient light noise portion; and

means for subtracting said first image from said second image to produce an output image substantially devoid of said ambient light noise portion.

2. A system for improving signal-to-noise ratio for an eye gaze tracker as recited in claim 1 wherein said first and second intervals comprise camera frames.

3. A system for improving signal-to-noise ratio for an eye gaze tracker as recited in claim 2 wherein said means for subtracting subtracts according to the expression $o_n = |f_n - f_{n-1}|$, where n is an integer ≥ 0, o is said output image, and f are said camera frames.

4. A system for improving signal-to-noise ratio for an eye gaze tracker as recited in claim 2 wherein said means for subtracting subtracts according to the expression $o_n = |f_n - (f_{n-1} + f_{n+1})/2|$, where n is an integer ≥ 0, o is said output image, and f are said camera frames.

5. A system for improving signal-to-noise ratio for an eye gaze tracker as recited in claim 1 wherein said first and second intervals comprise a first raster field and a second raster field, respectively, forming a horizontal stripe pattern.

6. A system for improving signal-to-noise ratio for an eye gaze tracker as recited in claim 1 wherein said first and second intervals comprise odd and even pixels forming one of a vertical stripe pattern and a checkerboard pattern.

7. A method for improving the performance of an eye gaze tracker system, comprising the steps of:

shining a modulated light on a user's eye during a first interval;

detecting said modulated light reflected from the

user's eye and simultaneously detecting noise light from an ambient source during said first interval and producing a first data comprising a reflection portion and a noise portion;

turning off said modulated light during a second interval;

detecting said noise light from said ambient source during said second interval and producing a second data comprising said noise portion; and

subtracting said second data from said first data to produce an output data comprising said reflection portion.

8. A method for improving the performance of an eye gaze tracker system as recited in claim 7 wherein said first interval and said second interval are camera frames.

9. A method for improving the performance of an eye gaze tracker system as recited in claim 8 wherein said subtracting step subtracts according to the expression $o_n = |f_n - f_{n-1}|$, where n is an integer ≥ 0, o is said output data image, and f are said camera frames.

10. A method for improving the performance of an eye gaze tracker system as recited in claim 8 wherein said subtracting step subtracts according to the expression $o_n = |f_n - (f_{n-1} + f_{n+1})/2|$, where n is an integer ≥ 0, o is said output data, and f are said camera frames.

11. A method for improving the performance of an eye gaze tracker system as recited in claim 7 wherein said first interval and said second interval are odd and even pixels, respectively.

12. A method for improving the performance of an eye gaze tracker system as recited in claim 7 wherein said first interval and said second interval are first and second raster fields, respectively, forming a horizontal stripe pattern.

13. A method for improving the performance of an eye gaze tracker system as recited in claim 7 wherein said first interval and said second interval are alternating pixels forming one of a vertical stripe pattern and a checkerboard pattern.

14. A computer readable medium comprising software instructions for controlling an eye gaze tracker system to execute the steps of:

turning on an illuminator to shine at a user's eye during a first interval;

detecting said modulated light reflected from the user's eye and simultaneously detecting noise light from an ambient source during said first interval and producing a first data comprising a reflection portion and a noise portion;

turning off said modulated light during a second interval;

detecting said noise light from said ambient

source during said second interval and producing a second data comprising only said noise portion; and

subtracting said second data from said first data to produce an output data comprising said reflection portion.

15. A computer readable medium comprising software as recited in claim 14 wherein said first interval and said second interval are camera frames.

16. A computer readable medium comprising software as recited in claim 15 wherein said subtracting step subtracts according to the expression $o_n = |f_n - f_{n-1}|$, where n is an integer ≥ 0, o is said output data, and f are said camera frames.

17. A computer readable medium comprising software as recited in claim 15 wherein said subtracting step subtracts according to the expression $o_n = |f_n - (f_{n-1} + f_{n+1})/2|$, where n is an integer ≥ 0, o is said output data, and f are said camera frames.

18. A computer readable medium comprising software as recited in claim 14 wherein said first interval and said second interval are odd and even pixels, respectively.

19. A computer readable medium comprising software as recited in claim 14 wherein said first interval and said second interval are first and second raster

fields, respectively, forming a horizontal stripe pattern.

20. A computer readable medium comprising software as recited in claim 14 wherein said first interval and said second interval are alternating pixels forming one of a vertical stripe pattern and a checkerboard pattern.